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The Massachusetts Medical Society.

MEETING OF THE SECTION OF MEDICINE, JUNE 18, 1918.

THE RELATION OF FOOD IDIOSYNCRASIES TO THE DISEASES OF CHILDHOOD.

BY FRITZ B. TALBOT, M.D., BOSTON.

THE part played by anaphylaxis in the diseases of childhood has opened a new and fascinating field for study and investigation. While more refined technique in the diagnosis of anaphylaxis has thrown much light on many diseases, there still remains much to be learned. The importance of diet in infancy and childhood cannot be over-rated, since it plays an all important part in four-fifths of the diseases peculiar to childhood. At first it was our custom to determine gross errors in diet by the microscopic examination of the stools, to see if there was too much fat, starch or meat passing through the digestive canal, undigested. It is now possible, by means of the "skin test," to find out which particular food is at fault.

The "skin test," which the writer has found most satisfactory, is the linear incision, which breaks the skin of the forearm just enough to draw serum but not blood. To this scarification is applied the food protein to be tested. If the patient is sensitive a characteristic urticarial wheal, surrounded by a red roseola appears, the reaction coming in from two to ten minutes, and fades in one-half to two hours.

A careful study of anaphylactic cases has shown that many individuals have a hereditary pre-disposition to sensitization. In twenty-eight cases of asthma studied by the writer, sixty-two per cent. gave a family history of anaphylaxis. In cases, therefore, that give a pronounced history of hay fever, asthma or eczema in the direct ancestors, special care should be taken on introducing a new foreign protein into the diet. It should be given in such a manner that it will cause immunity and not sensitization. For example, if a nursing infant, with a family pre-disposition to sensitization, is given cow's milk at intervals of ten days or longer, instead of daily, it might become sensitized to cow's milk, in the same manner that animals are experimentally sensitized.

During infancy and childhood practically all cases of sensitization are due to foods, since food is the commonest foreign protein with which they come in contact. During growth, however, a child adapts its body and habits to surrounding conditions, and by the time he has reached puberty, he has either learned the particular foods he cannot take without feeling ill or has taken small amounts of that food at frequent intervals and has gradually become "used to it," that is to say, become immunized. By the time puberty is reached, therefore, the idiosyncrasies to food are relatively uncommon.

In infancy and childhood, asthma, recurrent bronchitis, eczema and gastro-intestinal indigestion are the diseases which are most commonly due to foods. It is wise, however, to bear in mind that although the cause of these diseases in the cases herewith reported has been proved to be anaphylaxis, this explanation cannot be given as the cause for all cases of these diseases. It must also be remembered that although at first sight the problem may seem a simple one, it is, on the contrary, most complicated.

The commonest example of anaphylaxis, which has no doubt come within the experience of every one present, is idiosyncrasy to eggs. This is characterized by violent vomiting, and sometimes diarrhea, whenever the patient takes eggs, especially when raw. The following case is an example of this type:

CASE 1. O. S., boy, 19 months of age. One month previous to coming to the office, was given his first teaspoonful of egg white. His lips immediately swelled up like a balloon, spots came out all over him, and he vomited and had diarrhea. This was followed by an attack of bronchitis with "rattly breathing." His physical examination was negative except for a reddened throat. Skin tests were done and he reacted with a three plus reaction to egg white, and slightly to oat, wheat and beef serum. Since that time he has received no egg in his diet and the symptoms have not recurred.

Immunization as advised by Schloss of New York, by giving minute doses of dry egg powder by mouth in gelatin capsules, commencing with one milligram a day and working up to three or six grams a day, has proved to be very helpful in this type of case. It is thus possible to increase the resistance to egg, so that eventually the patient can take it without any symptoms. In severe cases it is necessary to continue treatment over a period of two or three years. If this is not done the patient will relapse, after the treatment has been discontinued for two or three months.

Asthma in children is, in the large proportion of instances, connected with anaphylaxis to some food. The commonest offender is egg, but other foods may be the cause, while egg is tolerated perfectly. Occasionally one food is the sole cause of the asthma, but more often a patient is sensitive to more than one. This is especially true of patients sensitive to the grains, which include all the cereals, rice and corn. Such patients usually react to more than one member of the grain family and also are apt to have the spring and early summer type of hay-fever due to grasses.

The following is an illustrative case of asthma due to multiple causes, and is an example of the botanical grouping of the offending proteins, to which Dr. Goodale was the first to draw our attention.

CASE 2. M. A., girl, aged 7 years, seen because of frequently occurring attacks of asthma. She had no symptoms of hay fever. She was a normal breast-fed baby and was perfectly well until 3½ years of age when she commenced to have attacks of coughing, coming every five to six weeks and ending with asthma. Recently these attacks have occurred without being preceded by coughing, and are more frequent at night. She was always able to take all kinds of food with impunity; flowers do not bother her, and a dog in the house caused no apparent ill effects. Her turbinates were cauterized and adenoids removed without relief. On physical examination, she was found to be a perfectly normal, well developed child. Her skin tests were as follows:

Wheat, sl. +.
Rice, sl. +.
Oat, . ? reaction.
Corn protein, +.
Rye, ++.
Barley, +++.
Sago, ++.
Pea, sl. +.
Orchard grass, ? reaction.
Dog serum, +.
Hen's feathers, ++.
Chicken protein, ++.

Her skin tests showed that she was sensitive to the botanical family of grains, also to the dandruff of the dog, and chicken feathers. Obviously it was necessary for her to keep away from dogs and chicken coops. The dietary treatment, however, was more difficult as it is almost impossible to eliminate all the grains from the food at one time and eat no starch vegetables but potato. The grains were, therefore, given in sequence of five days each and abstained from for ten days. In this manner certain grains were not being eaten for two-thirds of the time. The attacks were decidedly modified by this procedure, and she had long intervals of freedom from asthma. She is not, as yet, cured.

There is a group of asthma cases, however, in which sensitization to foods is evidently not the sole cause of the symptoms. In these cases there seems to be some unknown under-lying element which plays a part in the disease. This unknown factor may have some connection between either the nervous regulating mechanism or cecal stasis. What this connection is the writer is unable to state, but there have been cases where dietary treatment has been instituted with partial cure and appropriate treatment, designed to meet this underlying element, has apparently completed the cure.

Another of the respiratory diseases of childhood which may be due to foods is croup. This is probably the result of a local reaction of the mucous membrane of the throat when it comes in contact with the food to which it is sensitive. The dietary cause of croup in cases seen by the writer has usually been eggs. The following case is an example of this:

Case 3. E. B.,* a girl of four years. Her maternal and paternal grandfathers have asthma, and a maternal aunt rose colds. She had slight eczema as an infant. When one year of age she was given her first egg, which caused hives to appear all over her body within fifteen minutes, and her face became puffed up so that it was impossible to see her eyes, but she did not vomit. She had some symptoms of obstruction in the throat which were relieved by an enema. All symptoms disappeared at the end of two days. At two years, she received some pudding by mistake, which contained egg, and the same symptoms returned, with increased severity. The laryngeal obstruction was so great that intubation was necessary. Negative cultures ruled out diphtheria, and the patient gave a marked positive skin test to egg.

It is interesting to note the part played by foods in the bronchitis of infancy and childhood. Of ten cases of recurrent bronchitis studied by the writer, five were found to be sensitive to hen's egg, one to beef juice, two to oatmeal and two to horse keratin.

In the gastro-intestinal disturbances of anaphylactic origin in young children, sensitization to eggs is most commonly found, but idiosyncrasies to cow's milk are not uncommon. Sensitization to cow's milk usually manifests itself by vomiting, even when given in minute doses as small as ten drops. The following is a case of this type due to an idiosyncrasy to cow's milk:

Case 4. Girl, 5 months old, had to be weaned suddenly because the mother's milk gave out, and she was losing weight. Five days later she had symptoms of indigestion which disappeared after two or three days. On about the eighth day after the first indigestion of cow's milk, the digestive symptoms had entirely disappeared, but she had an urticarial eruption break out all over her face and body, which was so marked that she could not open her eyes. She was found to have an idiosyncracy to cow's milk. The cow's milk, nevertheless, was continued and the symptoms disappeared for good. In two cases previously reported by the writer[1] the children became so sensitive to cow's milk that their stomachs did not tolerate even minute amounts. These children thrived on goat's milk. Not all cases, however, with an idiosyncrasy to cow's milk are so fortunate as to be able to drink goat's milk. Such cases must be immunized in a manner similar to the method used in immunization against eggs.

Eczema in childhood, when not obviously due to too much sugar or fat in the diet, may be due to some individual food component. In a series of cases of eczema studied by the writer a positive skin test was most commonly obtained for egg white and cow casein. Eczema may, however, be due to other food proteins, such as rice. The following case is an example of this:

Case 5. G. D., girl, aged 17 months, started to have eczema after being weaned. Various forms of treatment were tried and the fat in the food was reduced without improvement. When first seen she had eczema of the neck and face which simulated urticaria in places. Her skin was tested and reacted to rice, hen's egg and cow casein, while wheat, pea and barley proteins were negative. Subsequent events showed that the eczema was primarily due to rice and could be controlled by omitting it from the diet.

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* Previously reported N. Y. State Jour. Med., 1917, Vol. 17, No. 9, p. 421.

[1] Idiosyncrasy to Cow's Milk; Its Relation to Anaphylaxis, Boston Medical and Surgical Journal, 1916, clxxv, No. 12, p. 409.

As a child grows older, anaphylaxis due to foods is less commonly seen, and is succeeded by the inspired asthmas and hay fever, due to the pollens of the flowers or to the emanations from horses or other domestic animals. This type of asthma may last through life and is common in adults. It does not, however, come within the scope of this communication. The bacterial asthma, as a rule, do not develop in early childhood, but are said to be common in adults. The writer has not seen any cases of asthma due to bacteria in the children studied.

A CLINICAL STUDY OF 400 PATIENTS WITH BRONCHIAL ASTHMA.*

BY I. CHANDLER WALKER, M.D., BOSTON.

MY aim in this paper is to present as many useful facts as possible in the determination of the cause and the treatment of bronchial asthma. These facts which have been obtained from a study of 400 patients with bronchial asthma may all be used to advantage by you in general practice.

The cases were about equally divided between the two sexes; there were 198 males and 202 females in the series. The nationality of the patient played no part in the cause or the frequency of the disease; so-called neurotic races, as for instance the Jewish race, were no more prone to asthma than other nationalities. Occupation, as a rule, played no part in the cause or frequency of asthma; however, occasionally, occupation did have a bearing upon the cause of asthma. For instance bakers frequently have bronchial asthma from the inhalation of the flour with which they work. Two unusual instances where occupation bore a direct relationship to the cause of asthma are sufficiently interesting to mention. A man whose work consisted of sifting green coffee beans became sensitized to the protein in the green husks and had asthma from the protein. Another man whose work was that of a jewel polisher became sensitized to the protein in the dust from the boxwood with which he polished the jewels. An enquiry also should be made always in regard to the presence of pet and domestic animals at the patient's home, and where he works.

The mode of onset of asthma or the symptoms preceding asthma have little bearing upon the cause since in the majority of cases the onset is with what the patient calls a cold or bronchitis. Frequently these colds and attacks of bronchitis are not such in the sense of a disease or an infection but instead they are the first symptoms of sensitization to some protein, and months may elapse before the physician realizes that the patient has asthma; and the association of eczema with bronchitis and asthma is of considerable importance, since such patients are frequently sensitive to some type of protein; and the younger the patient is when these conditions manifest themselves the more probable it is that the patient is sensitive to some food protein. This is especially true in infancy.

The time of the year at which the patient began to have asthma, and the season of the year, if it always limits the attack of asthma, are important. Attacks of asthma which occur only during the summer months are usually caused by the protein in the pollen of plants. In many instances this summer type of pollen asthma is prolonged throughout the year by bacteria which, because of the patient's lowered resistance, cause a bronchitis, and this in turn causes asthma. In a few instances the early type of a summer asthma is due to bacteria rather than to pollen. A number of patients have asthma only in the early spring (March and April) and in the late fall (October and November) and these patients associate asthma with the changeable weather; in such cases bacteria are frequently the cause. Some patients have asthma only in the winter months when the air is clear and cold and bacteria are again the cause.

The length of time that a patient has had asthma is important, since one must bear in mind that the longer one has asthma the more pronounced may be the resultant bronchitis and emphysema, so that the asthma may not be relieved by removing the offending cause but the bronchitis must also be treated. The age of onset of asthma is most important, but before we go into this we must define sensitization and outline the methods of testing a patient to determine whether he is sensitive or not.

When a person is sensitive or anaphylactic to a particular substance, ill effects or certain symptoms are produced in that person by the entrance of that substance into his body. One type of ill effect or symptom is an attack of bronchial asthma. We also know that it is the protein element in that substance that causes asthma, and we must not lose sight of the fact that proteins are most widely distributed in nature. Therefore patients may be sensitive or anaphylactic to proteins and if so these proteins may be the cause of bronchial asthma. Proteins enter the body by inhalation, by ingestion, by absorption and by infection. Inhalation takes place through the respiratory tract and chiefly concerns the protein in the pollen of plants, in the emanations and hair of animals, in the flour of cereal grains and in some kinds of dust. Ingestion has to do with the protein in food and we know that foods, after entrance into the gastro-intestinal tract, do cause asthma. Absorption, apart from inhalation and ingestion, concerns the conjunctivae and to a less extent the skin. By infection we mean the presence of pathogenic bacteria in any part of the body but more especially foci of infection located in the teeth, tonsils, nose, throat and lungs. In the case of bacteria we have to deal with the protein element as well as with the infectious element.

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* Read before the Ontario Medical Association in conjunction with the Canadian Medical Association, at Hamilton, Ontario, May 30, 1918.

There are several ways of testing a patient in order to determine whether or not he may be sensitive to protein. One commonly used method is known as the intradermal test which, in our experience, has proved to be too sensitive and too delicate, if not erratic. The test which has proved to be safe and reliable as regards hay-fever and asthma is the skin or cutaneous test, which is performed as follows: A number of small cuts, each about one-eighth of an inch long, are made on the flexor surfaces of the forearm. These cuts are made with a sharp scalpel, but are not deep enough to draw blood, although they do penetrate the skin. On each cut is placed a protein and to it is added a drop of tenth-normal sodium hydroxide solution to dissolve the protein and to permit of its rapid absorption. At the end of a half hour the proteins are washed off and the reactions are noted, always comparing the inoculated cuts with normal controls on which no protein was placed. A positive reaction consists of a raised white elevation or urticarial wheal surrounding the cut. The smallest reaction that we call positive must measure 0.5 cm. in diameter and any smaller reactions are called doubtful. Negative skin tests with protein rule out those proteins as a cause of asthma and all proteins which give a positive skin test should be suspected as a cause of asthma. In the case of bacteria, however, the skin test has to do only with the protein element, so that even though bacteria give a negative test, they may still be a cause of asthma through their infectious nature, and the patient need not be sensitized to bacterial protein.

Of the 400 cases studied, 191 or 48% gave a positive skin test and were therefore sensitive to some protein. According to sex, 53% of the sensitive cases were males and 47% were females; and of the total number of males studied, 51% were sensitive; and of the total number of females, 44% were sensitive. Therefore, although the prevalence of asthma between the two sexes was about equally divided, the percentage of sensitive cases was a little higher among the males than among the females. While considering the above percentages of sensitive cases it should be borne in mind that doubtful and slightly positive skin tests are not being counted; only those reactions which were a distinct urticarial wheal measuring 0.5 cm. or more in diameter are included, so that the number of sensitive cases is computed on a very conservative basis.

The following table is presented in order to show the importance of the age of onset of bronchial asthma. In the first column the age of the patient is divided into five year periods with the exception of the first five years of life which is subdivided into two periods, namely, under two years of age, which corresponds to infancy, and between the ages of two and five. Other columns, by following across the page on a line with the age of onset, show respectively the number of cases, the percentage of cases, the number of sensitive cases, the percentage of sensitive cases and the number of cases sensitive to the protein which are found in the four principal sources, namely, animal hair, food, bacteria and pollens at that particular age of onset of asthma.

It is noted that about the same number of patients had their first attack of asthma at each period of years with the exception that after the age of 45 years there was a great decrease and after the age of 60 there were only three cases; it may be surprising to know

Age at Onset of Asthma	Number of Cases	Per Cent. of Cases	Number Sensitive	Per Cent. Sensitive	No. Sensitive to Protein in: Animal Hair	Food	Bacteria	Pollen
Under two years	34	9.0	28	83	19	23	5	15
Between 2—5	30	7.5	27	90	14	9	2	6
" 5—10	37	9.0	15	40	12	5	2	15
" 10—15	35	9.0	24	70	6	5	5	13
" 15—20	26	6.5	14	54	8	5	2	5
" 20—25	42	10.0	22	52	6	7	2	12
" 25—30	35	9.0	17	49	7	1	5	9
" 30—35	43	10.0	21	49	3	4	5	9
" 35—40	52	13.0	12	23	2	5	4	3
" 40—45	37	9.0	9	24	1	4	1	3
" 45—50	9	2.2	2	22	0	0	0	2
" 50—55	11	2.7	0	0	0	0	0	0
" 55—60	6	1.5	0	0	0	0	0	0
Over 60	3	0.7	0	0	0	0	0	0
Total	400		191	48	78	68	33	92

that the number of cases that developed asthma under the age of two and between the ages of two and five was as great as at any other age. The relationship between the age of onset of asthma and the sensitization of the individual is important. Of the patients who began to have asthma under the age of two, 83% were sensitive to some protein; of those whose onset was between two and five, 90% were sensitive; of those beginning asthma between 5 and 10, 40% were sensitive; of those between 10 and 15, 70% were sensitive; of those having onset of asthma during the succeeding 5 year periods between the ages of 15 and 35, 52% were sensitive for each period; between the ages of 35 and 50 only 23% were sensitive; and after the age of 50 no patients were sensitive. The above statements may be summarized as follows: 83% of the patients who began to have asthma during infancy (under the age of two) were sensitive; during childhood or between the ages of 2 and 15, 66% were sensitive; during young adult life or between the ages of 15 and 35, 52% were sensitive; during middle life or between the ages of 35 and 50, 23% were sensitive; and none were sensitive when the age of onset of asthma was after 50. Stated briefly, four-fifths of the patients who began asthma during infancy were sensitive; two-thirds who began during childhood were sensitive; one-half of those beginning asthma during young adult life were sensitive; one-fourth of those beginning asthma during adult life were sensitive; and none were sensitive that began asthma after the age of 50. As the age of onset of asthma increases, the frequency of sensitization decreases, and the knowledge of this is a great help in practice.

The relationship between the ages of onset of asthma and sensitization to different types of protein is also very important. In the table, it is noted that nineteen patients, who began to have asthma under the age of two, were sensitive to animal hair proteins; of this number, ten were sensitive to the proteins of horse hair alone, one to cat hair alone, and the other eight patients were sensitive to the proteins of the hair of horse, cat and dog, although they were more sensitive to the hair of horse than to the hair of the cat or dog. Of the patients whose onset of asthma was between the ages of two and five and between five and ten, fourteen and twelve patients respectively were sensitive to the proteins of animal hair, and in each instance eight of these patients were sensitive to horse hair proteins. Succeeding ages of onset of asthma show a gradual decrease in the number who were sensitive to animal hair protein. Sensitization to food proteins was by far most frequent among those patients who began to have asthma during infancy. Of the twenty-three patients, nine were sensitive to egg protein, eight to the cereal grains, and three to milk. Of the nine patients who began asthma between the ages of two and five and who were sensitive to food proteins, two were sensitive to egg and five to cereal grain proteins. Succeeding ages of onset of asthma show about a constant average of frequency in the sensitization to foods, but the frequency of sensitization to egg, milk and cereals is much less than for other food proteins, such as fish, meat and potato.

The frequency of sensitization to the bacterial proteins was about the same for all ages up to 40 years. More patients were sensitive to the protein of Staph. pyog. aureus than to any other type of bacterial protein. However, sensitization to the protein of Staph. pyog. albus and the various streptococci was sufficiently frequent to warrant routine tests with these. In the above table the number of positive reactions with bacterial proteins is too conservative, since many definitely positive reactions which do not measure 0.5 cm. in diameter are obtained.

It is of interest to note the effect of occupation on sensitization after the age of 40. Of the eleven patients who became sensitive to proteins after the age of 40, four were bakers and were sensitive to wheat protein, one was a hostler and was sensitive to horse dandruff protein, and another who was a sifter of green coffee beans was sensitive to green coffee protein; therefore in over half of these cases occupation was responsible for the cause of asthma.

In the table it is noted that 78 patients were sensitive to the protein derived from animal hair. Of this number, 43 were sensitive to horse hair alone, 5 to cat hair alone, 3 to feathers alone, 2 to cattle hair alone, one to wool alone; the remaining 24 patients were all sensitive to horse hair in combination with either dog hair or some of the other types of hair. Therefore, of animal emanations, the protein of horse hair is by far the most frequent cause of asthma and the hair of the dog is the least frequent cause of asthma.

Of the 68 patients who were sensitive to the food proteins, 35 were sensitive to the cereal grains, and of these 35, 25 were sensitive to wheat alone, 3 to corn alone, 2 to rice alone, and the remaining 5 patients were sensitive to all of the cereal grains. Among the 33 remaining food cases, 13 were sensitive to egg, 5 to casein, 8 to fish, and 7 to potato; an occasional patient who was sensitive to one of these types of protein, was also sensitive to some other food protein, such as beef, chicken or spinach, but sensitization to foods other than those already mentioned was unusual. Therefore one-half of the food cases were sensitive to the proteins of the cereals, and wheat was by far the most common food to cause asthma; next to wheat in frequency came egg, then fish, potato and casein were close thirds, and other foods were too infrequent to be enumerated.

Of the 92 patients who were sensitive to pollens, 17 were sensitive to the early pollens, and timothy was the chief one of these, 45 were sensitive to the late pollens and ragweed was the chief one of these, and the remaining 30 patients were sensitive to both early and late pollens. Sensitization to rose, red top, daisy and golden rod was infrequent.

There is one more important point which the above table illustrates, namely, multiple sensitization or sensitization to more than one type of protein. For instance, if we add together the number of cases who were sensitive to horse hair, food, bacteria and pollens, we have a total of 272 sensitive patients, whereas, in reality, there were only 191 sensitive patients in the series. In other words, some of the patients were sensitive to more than one type of protein. On consulting the table it is noted that multiple sensitization is by far most frequent among those patients who began to have asthma during infancy, that it is quite frequent among those beginning asthma between the ages of two and five and between five and ten, but after these ages multiple sensitization is not very usual. Since the majority of the patients in this series were young adults or older when tested, it is fair to assume that the longer a sensitive patient has asthma the more apt he is to be sensitive to more than one type of protein, and sensitization to one protein early in life is apt to be followed by sensitization to other proteins early in life; and vice versa, non-sensitization early in life is not so apt to be followed by sensitization later on. Among the few infants which were tested in this series, multiple sensitization was frequent.

A positive skin test with several different proteins may mean that all of them are causing asthma or that only some of them are causing asthma at present and that the others have been or may be in the future the cause, or even it may mean that none of the proteins are at present the cause, but that they have been the cause, and now secondary infection is the chief cause of asthma. Treatment will naturally reveal the present cause. Suffice it to say that positive skin tests by proteins which seem to have no bearing on the cause of asthma should be considered as danger signals and not as false reactions; such positive tests should not be disregarded.

The treatment of sensitive cases is largely a matter of judgment in deciding which positive test should be first investigated. If the patient is sensitive to food proteins, such foods should be omitted from the patient's diet for at least a month in order to see what effect they have on the asthmatic condition. In this series of cases nearly all of such patients have been relieved of asthma. In a few instances, however, because of the associated bronchitis, autogenous sputum vaccines have been required in conjunction with the restricted diet. Attempts to desensitize the patient against offending food protein by the subcutaneous injection of or by feeding gradually increasing amounts of the protein have failed. We have reasons, however, for believing that total abstinence from the offending protein for a long interval automatically desensitizes the patient for that protein.

Patients who are sensitive to bacterial proteins may be successfully desensitized against such by treatment with vaccines of those organisms, but great care must be exercised not to give too large and too rapid an increase in the amount of vaccine. The first dose of vaccine should not be larger than one hundred million bacteria, and each succeeding dose should not be more than fifty million over the preceding dose.

Before treatment is undertaken for those patients who are sensitive to the protein of horse dandruff or hair and of pollens, skin tests must be done, using various dilutions of these proteins. Treatment should be begun with the dilution next higher than that which gave a positive test; the first dose should be small, usually 0.1 cc., and each succeeding dose should not be more than 0.1 cc., over the preceding one. These treatments may be given at five-day or seven-day intervals. The treatment of patients who are sensitive to hair proteins with the serum of that animal is of no avail, and is very dangerous. Patients who are sensitive to pollen proteins should be treated in anticipation of the season. Occasionally it is necessary to use vaccines in conjunction with the animal hair proteins in order to benefit the associated bronchitis, but usually this is not the case.

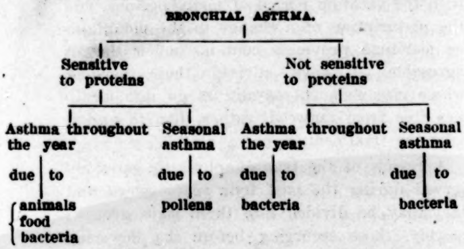
Those patients who show multiple sensitization, that is, those who give positive skin tests with many different types of proteins are the most troublesome to treat; in such cases treatment is a matter of judgment. Not an unusual case is one who gives positive skin tests with the proteins of wheat, horsehair and pollens. Naturally wheat should be omitted from the diet anyway, and if the patient is exposed to horses treatment should be given with the horse hair proteins, in fact such treatment is advisable since the patient may be at any time so exposed, and in anticipation of the pollen season the patient should be desensitized against these. Thus all possible known causes will be eliminated. Even then autogenous sputum vaccines may be required.

The results of dieting in those sensitized to food proteins and the results of treatment with animal hair, pollen and bacterial proteins in those so sensitized have been most successful. And in those patients who have not been relieved by such treatment, autogenous vaccines have been of much benefit. The permanency of relief depends upon the amount of treatment and the patient's power of resistance.

The non-sensitive patients, or those who fail to give positive skin tests with proteins, may be disposed of in a few words since there is little to guide us in the cause and treatment of asthma. Occasionally the serum of such patients positively agglutinates some type of organism, and treatment with vaccines of that organism frequently benefits their asthma. The non-sensitive patient usually presents the symptoms and physical signs of bronchitis; he gives a history of persistent cough between attacks and there are râles in the lungs between attacks. Often these patients are relieved or greatly benefited by autogenous vaccines, consisting of the predominating organism in their sputum. These vaccines are prepared as follows: thick sputum, which is raised after a paroxysm of coughing, is washed repeatedly in sterile normal saline, and a portion is streaked on large surfaces of plain agar and another portion is shaken and macerated in dextrose bouillon, from which tubes of blood agar are inoculated and plated. The plain agar facilitates the identification of some organisms and the blood agar identifies the various types of streptococci. The most satisfactory results follow treatment with the predominating organism. The largest number of patients have been relieved by vaccines of Staph. pyog. aureus, streptococcus hemolyticus and diphtheroid organisms when these have been the predominating ones isolated from the sputum. Other organisms may predominate and cause asthma. For instance, one patient has been relieved by an atypical Type II pneumococcus, another by Friedländer's bacillus, a few by an unidentified Gram negative staining bacillus, a few by Staph. pyog. albus and by Streptococcus viridans; in each instance the predominating organism was the one used. Occasionally patients are troubled more from a catarrhal condition of the nose and throat than from cough, and in such cases it is often necessary to use vaccines made from these sources of infection. Naturally the teeth, tonsils and sinuses may be the seat of infection, and such foci, if present, should be attended to. In general, however, we are inclined to be very conservative in regard to operations as a relief for asthma, and the possibility of sensitization to proteins should first be ruled out.

We feel that the following is a good and useful classification to use in determining the cause and treatment of bronchial asthma.

CLASSIFICATION OF CAUSES OF BRONCHIAL ASTHMA.



After what has been noted in this paper, the above classification needs no description. Although neurasthenic, neurotic and psychoneurotic conditions are frequently associated with bronchial asthma, we feel that these conditions are not sufficiently often a cause of asthma to warrant a place among causes of asthma. Furthermore, no provision is made for so-called cardiac and renal asthma, since we do not accept shortness of breath on exertion, nocturnal dyspnea and bronchitis, all of which are associated with cardiac and renal disease as bronchial asthma. The combination of all of these symptoms does in a way simulate bronchial asthma, but for such a syndrome we feel that the term asthmatic bronchitis is more appropriate; such a term would imply bronchitis with asthmatic symptoms, and this is really the true condition present. Cardiac and renal patients may have true bronchial asthma; however, in these cases the asthmatic condition is entirely separate from the cardiac and renal disease; they are two distinct conditions not dependent upon each other.

THE PRESENT STATUS OF IMMUNIZATION IN HAY-FEVER.

BY J. L. GOODALE, M.D., BOSTON.

THE object of the following paper is to present briefly the results of an investigation begun in 1914, with the purpose of determining the value of desensitization in hay-fever.

Since the method was initiated by Noone and Freeman in 1911, the literature has become increasingly filled with reports from various observers, who have in general expressed themselves favorably as to the results obtained.

In an experience covering four years the writer has come to the conclusion that the majority of the reports hitherto published have not taken sufficiently into account the variability of the seasons in regard to the abundance of pollen produced, as well also as individual and temporary alterations in the physical state of the patients. It has seemed to me, therefore, preferable in the present communication to present a study of a relatively small number of patients, where the treatment has been carried out for not less than two years, in order to eliminate so far as possible such modifying factors.

In the examination of a given case of hay-fever, the first point to determine is whether the vasomotor symptoms are actually excited by the pollen of plants, or whether they arise in response to a stimulation of the nasal nerves through other agencies. A fairly large proportion of the cases which have come under my observation have shown no response to any of the pollens tested, but have been excited by the fragrance of certain plants, such as lilies of the valley, sweet peas, hyacinths, lilacs, etc. In these plants the amount of pollen disseminated must be extremely slight, owing to the relatively small amount produced in the flower, and by the heavy and viscid character of the pollen grains themselves. Tests, moreover, with the pollen in such cases has failed to show a skin reaction, although the patient within the radius of the fragrance of the flower will be thrown into more or less violent attacks of sneezing or even of asthma. Such conditions I have termed in a previous paper olfactory vasomotor rhinitis or pseudo-hay-fever. It is therefore of great importance to test all cases on the skin even though their symptoms may be distinctly seasonal. I have, however, noted, that these olfactory types of vasomotor rhinitis display their symptoms usually during the earlier summer months. In most instances patients whose symptoms develop only in late August and early September, have been of the true anaphylactic type due to ragweed.

SEASONAL VARIATIONS IN HAY-FEVER.

A word should be said in regard to the variations which hay-fever cases show in the intensity of their symptoms from year to year.

Aside from individual changes in health or intrinsic resistance, hay-fever symptoms may be considered directly dependent upon the amount of pollen which is received by the individual upon the mucous membranes. A person living in the city receives naturally a smaller quantity than one whose work and recreation bring him more directly into the country. Aside from this factor, the character of the season should be noted. Hay-fever producing plants, if trees or well-established shrubs, are less likely to exhibit variations from year to year, whereas both grasses and ragweed will exhibit marked variations dependent upon the season. We should remember in respect to grasses, that these are essentially plants preferring cool, moist weather, and that the amount of pollen produced will be greater under these conditions, than where the season is hot and dry. The ragweed, on the other hand, is the most Northern representative of a Southern group of plants, and is especially dependent upon heat for its proper maturity. This explains its absence in Bethlehem, N. H., and similar localities, where the seasons are too short to enable it to ripen its seeds. The time of occurrence of ragweed hay-fever depends in great measure upon the earliness of the spring, and observations carried on for a period of five years have shown, with a normal May temperature of 58, the time of flowering ragweed in my locality is August 25th. If the May temperature is distinctly below the average the time of flowering is retarded, and is not even sufficiently accelerated by a hot July and August.

When a patient presents himself for the the treatment of hay-fever, it should be first determined whether in the individual case desensitizing treatment should be recommended, or whether the patient should be advised to seek refuge from his symptoms by a change of climate. In regard to the early forms of hay-fever, namely from the trees and grasses, it should be recogized that the so-called hay-fever resorts will not afford relief, since these have reference only to the freedom of the locality from ragweed. A patient who wishes, therefore, to escape the early forms should direct his face to the South or far West, where the conditions are such as not to favor the development of grasses, or where the particular trees either are absent or have finished flowering. A case of spring hay-fever will therefore find immunity in the South or in California, but naturally such a change of climate at this season may present obstacles. These spring cases may therefore usually be advised to have immunizing treatment. In the case of ragweed hay-fever, the time of its occurrence coincides with the vacation period of many persons, and the prescription of a change to the mountains or maritime provinces contains much that is agreeable. I have advised those persons, whose circumstances permit, to go into localities free from ragweed, rather than to undertake the treatment.

A review of the true anaphylactic cases observed during the past four years shows that they may be divided into three main groups: namely, those occurring before the flowering of the grasses in April and May, and dependent upon certain trees which disseminate a large amount of pollen, such as the maple, willow, birch and oak; second, the grasses in late May and throughout June; third, by far the largest number, in August and September, from the ragweed. A few patients are also found during the period of the flowering grasses, where the symptoms have been shown to be due to members of the rose family. The history of the patients enables us therefore to simplify the procedure in our diagnostic tests. Cases whose symptoms appear in April or May, and cease in June, may be confidently regarded as not dependent upon either the grasses or the ragweed, and are consequently to be tested with the pollen of the early flowering trees which occur in the individual's neighborhood. Those with symptoms in May and June, terminating in July, are to be tested by grass, oak and rose pollen, while finally the August and September types may be immediately examined with regard to the degree of sensitization which they show to ragweed.

The diagnosis of the special exciting cause is made by application of the pollen suspected to a superficial scratch on the skin of the arm in the usual manner. I may repeat here the observations of a previous paper that a knowledge of the phylogenetic relationships of the various plants enables us to curtail materially the number of tests. One grass pollen will suffice for all grasses, one rose pollen for all members of the rose family, and ragweed pollen for all of the compositae.

COLLECTION AND PRESERVATION OF POLLEN.

One may in this vicinity feel reasonably confident that he can treat the cases which present themselves if he has pollen of the following plants: willow, poplar, maple, birch, oak, grass, rose and ragweed. Although frequently accused by patients of producing hay-fever symptoms, horse chestnut, lilac, honeysuckle and peonies have not produced skin reactions. The pollen is best kept dry and will preserve its activity for many years, although after being once thoroughly desiccated, it requires soaking for a longer time for the preparation of the extract.

Investigations carried out by R. P. Wodehouse for me in 1915 showed in the case of ragweed pollen that there were present albumen and proteose, both capable of exciting skin reactions. The globulin present did not cause skin reaction in ten cases which were tested, and probably therefore need not be considered as an anaphylactic factor. The albumen is relatively unstable in solution, being readily affected by exposure to air, and is precipitated by boiling and treatment with alcohol in strength above 14%. Freshly prepared pollen extracts given a skin reaction of a certain size, will, if exposed to air, after the lapse of a few weeks, even though prevented from decomposition by phenol, show a reaction of decidedly smaller extent, and the preparation has at the same time become distinctly cloudy. Also freshly prepared pollen extracts show on boiling or treatment with alcohol an immediate clouding and a loss of their skin reactions of about one-half. The preparation, after this first diminution in its activity by coagulation of its albumen, will then show a skin reaction of the same degree of intensity for a much longer period, at least for several months. Since, therefore, we are dealing with a material containing an extremely unstable albumen, and a relatively stable proteose, our task is to obtain, if possible, a pollen extract which will retain a constant degree of activity for a sufficiently long period to enable us to make comparative observations from time to time in the same case. This may be accomplished either by placing the freshly prepared pollen extract treated with sufficient phenol or some similar antiseptic in tightly closed receptacles, and withdrawing, as occasion requires, the amount needed without exposure to air, or by placing definitely measured amounts of the pollen solution in small vials, and rapidly evaporating to dryness, re-dissolving again when needed. Both of these methods are already in use, and will, I believe, give good results. I have, however, for my own work, made use of the effect of alcohol on the albumen to effect its coagulation, and make my own preparations as follows:

The pollen is obtained in the usual way as described by Wodehouse. One gram is soaked in a small amount of normal salt solution for forty-eight hours and filtered. The filtrate, which contains albumen, proteose and other proteids, is then treated with sufficient alcohol to bring the alcohol content up to 20%, by which albumen is thrown down in the form of flocculent precipitate. To this fluid is added enough 20% alcohol to make a volume of 500 C.C. In this, which is termed our standard extract, we have the amount of proteid extractable from one gram of pollen contained in 500 C.C. of 20% alcohol. Dilutions of this are made in the proportion of 1-2000, 1-5000, and 1-50,000. Both in making these dilutions and in giving the injections, the bottle containing the material should be shaken sufficiently to distribute equally the suspended particles of albumen.

ADMINISTRATION OF POLLEN EXTRACTS.

The injections are started, if possible, several weeks before the expected attacks, although they have seemed of value even after the symptoms have begun. In the first instance we may speak of prophylactic treatment, in the second, of abortive treatment.

PROPHYLACTIC TREATMENT.

I advise patients to report, if possible, ten weeks before the expected onset of their attacks, although a shorter period is usually sufficient. The ordinary course of procedure is to inject from one to three minims of the 1-50,000 dilution. This causes in nearly all cases subcutaneous swelling ranging from one to three centimeters in transverse diameter, lasting from one to three days. This material as above made with coagulated albumen produces a different effect than does the injection of material of equal strength, where the albumen is in solution. In the first instance the local reaction is not immediately as marked, and requires a longer time for its disappearance. Second, the coagulated material has not caused any of the general anaphylactic disturbances of which a few had been previously seen in using the dissolved albumen. After the reaction from the first injection has subsided, one may then double the amount, and a few days later give twice the amount of the second injection. The next higher strength of 1-5000 is taken, and three injections of this are given, ranging from three to seven or eight minims. Next a similar quantity in three doses is given of the 1 to 2000, and finally the full strength of 1 to 500, in doses ranging from 5 to 10 minims. The number of injections required during the first year has ranged from six to fifteen, depending upon the rapidity with which the dosage can be increased.

ABORTIVE TREATMENT.

If the individual reports at the beginning of his hay-fever, I have adopted the method of giving small daily injections, without waiting for a subsidence of the reactions, the successive injections being made in the forearms and upper arms respectively. I do not believe that it has been demonstrated beyond dispute that in these cases there has been a positive arrest of the symptoms as a result of the injections, but nevertheless, so large a proportion of cases so treated have had the symptoms disappear in the course of a week, which would ordinarily have persisted for six weeks, that I am induced to continue this as the best means of affording relief.

At the close of the hay-fever season the patient may be assumed to have attained a relatively high degree of resistance to the pollen in question. With the omission of treatment the sensitization slowly and progressively returns, until at the beginning of the following year the skin tests show the same degree of intensity which they did originally. This fact is striking and has been brought out in all the cases under observation. An individual, for instance, who shows a No. 1 reaction, will, year after year, show one of the same degree, and a No. 4 reaction will, each spring, appear as a No. 4.

RESULTS OF TREATMENT.

Since the spring of 1914 I have examined in private practice 330 cases of hay-fever. (The new cases appearing during the current year are not included, as they comprise, at the present date, June, a disproportionately large number of spring types.) In addition there were seen 18 cases of olfactory vasomotor rhinitis of a seasonal form.

Of the true anaphylactic type, 90 were from grasses, 237 from ragweed, 5 from maple, 4 from roses, 3 from oak, 1 from willow and 5 from birch. In these latter groups are reckoned only those patients whose symptoms were unmistakably and preëminently due to the plants in question. Cases, for instance, of grass hay-fever, giving also a moderate rose or oak reaction, are not included. A fairly large number, however (about 10%), of the grass cases, showed definite ragweed reactions and symptoms.

Of the above 330 cases of true hay-fever 123 have received desensitizing treatment for two or more years. I have endeavored to classify the results according to the statements of the patients in connection with my own estimate of the situation, into four groups, as follows:

1. No improvement noted, 7 cases.
2. Improvement as compared with previous years, but showing, nevertheless, troublesome symptoms for a short time, 46 cases. These patients in general may be considered as only moderately well-satisfied with the results, and, in my opinion, were not materially better than most cases treated in previous years by cauterization and general hygienic measures.
3. Very definite improvement, apparently beyond criticism, was observed in 59 cases. These include patients with a previous history of severe attacks, who, under treatment, exhibited only slight symptoms, causing not more than moderate annoyance. Here are included patients with a previous history of hay asthma, who were able to go through two or more summers without asthmatic symptoms.
4. Five patients showed no hay-fever for two or more years. By this is meant complete absence of subjective or objective vasomotor disturbance, in spite of full exposure to pollen.

In examining further the results which have been accomplished we may consider first whether any difference has been observed in regard to the three types of hay-fever found, whether of the grass or ragweed or of the other scattered forms. No appreciable difference was observed between the grass and ragweed cases in this respect; but it should, however, be said that the early spring forms from maple and birch, which usually occur in association, while few in number, have been the least successful in overcoming the vasomotor symptoms. Whether this is due to some unrecognized pollen or not is uncertain, but a careful survey of the patient's neighborhood has failed to show any other trees or shrubs which might have been of influence. Dr. Key has reported from Texas severe hay-fever from the mountain cedar. I have not tested patients with the counterpart of the tree, namely, our common red juniper; but its distribution is limited, and it would seem unlikely that it could prove a factor. None of these cases has reacted to the pollen of pines which is so abundant at the season in question.

Another point to consider is the relative success achieved in the first two and the latter two years during which this form of treatment has been carried on. The essential difference in the mode of treatment in the last two years has been the use of larger doses with insoluble pollen. It has been observed that cases treated for three or four years have shown an improvement directly proportional to the amount of albumen employed in the preparation, and during the last season (1917) the proportion of cases who reported great improvement or complete immunity was larger than in the first two years, where an albumen in solution was employed. I prefer now to bring all cases up to a tolerance which enables them to receive a dose of five minims of the 1-500 solution.

DISCUSSION.

Dr. J. A. Turnbull, Allston: As to Bethlehem for a hay-fever resort it has improved some patients and on others it has had no effect, and still others it has made worse. The hay-fever cases should be tested out not only for the pollen but also for the foods and bacterial sensitizations. I have seen a number of cases in which the foods show marked reactions, but no objective or subjective disturbances during the other seasons. If the foods are taken at the time of the hay-fever season, with the inhalation of the pollen, which increases the amount of sensitive proteins, it is more than the patients can stand and their symptoms are made worse. I have found in a number of cases that at the time of the hay-fever, omitting those foods from the diet the patients were much better and easily desensitized, and their symptoms improved in every way.

As to the treatment of hay fever, I think a great deal depends on what media we use for the solvent for our proteins. I have worked out a number of solvents and have found great differences in the reactions. I have been working with those which gave greatest reactions, and am waiting to see the results of autumnal cases. Spring cases showed great improvement. We often find many cases commence in the early spring and continue through to the early fall. I have seen some beginning with oak and birch and then are kept going by the grasses and the ragweed. Those cases continually load up first with one pollen and then with the others. They are extremely sensitive as to treatment. I have seen cases in which one or two doses of pollen protein have given a marked relief—even after one dose I have seen cases in which the symptoms were relieved at once. Other cases are more sensitive and take a greater number of doses. Occasionally we come across a person who does not react well to pollen. No doubt with the work which is being carried on, you will later on find something that is going to assist in those cases. Another thing is that with the pollen cases they often continue beyond the season. Those cases I have found are due either to some special food or to a bacterial protein. By omitting the food from the diet some cases are improved at once. In other cases where it is a bacterium I use the extract of the bacterium which has been used for the test; a solution made of this for desensitization, instead of the regular vaccine.

I have been greatly pleased with the papers that have been read this afternoon, and have enjoyed them very much.

Dr. W. H. Smith: I think anything that tends to bring asthma out of the murky darkness of a neurosis is of extreme value. We have tried to present to you up to date the work that is being done on hay-fever and asthma, and I have asked some of the men who are constantly seeing cases of asthma, and who saw cases before the vaccine and protein sensitization reactions were recognized, to speak about asthma and their experience with it before the fact was recognized and after—namely, in their experience are the asthma cases more clearly defined? Are the methods of treatment helping them to solve their problems in the asthma cases? I will ask Dr. Taylor of Cambridge to say something.

Dr. F. W. Taylor, Cambridge: After these scientific papers a general practitioner can add nothing of importance. You ask for my results and my experiences before and after the present methods of treatment. The cases I have seen have been so few that really no important conclusions can be drawn from them. I have seen some cases that have been treated in a modern way. My experience corresponds to what has been shown this afternoon—that is, that the seasonal cases are improved but the cases that last throughout the year get very little improvement.

As to the treatment of asthma in previous years, the cases of bronchial asthma were relieved at the time of the asthmatic seizure by some opiate, chiefly Dover's powder or morphine. Of course, smoke of various powders containing stramonium and the like gave some relief. Then a prolonged treatment with potassium iodide seemed to be of benefit in many cases. That it completely cured them I wouldn't say, but it got them over the attack of bronchitis and relieved them for a considerable period.

There is one observation that has not been referred to here, and that is that different members of the same family will show different types of sensitization. I have in mind one family in which the father has persistent attacks of bronchitis accompanied by attacks of asthma, which is not very well developed, however. The oldest child as an infant was very sensitive to cow's milk. The mother's milk gave out soon after its birth, and one thing after another was tried until it was put on human milk—a wet nurse was employed, and then the child gained progressively. The next child showed a little sensitization to milk and developed eczema very early in life. The third child was very sensitive to egg, suffered from eczema, and a moderate degree of bronchial asthma; so that there you have in four members of one family asthma in two, eczema in two, intolerance of milk in one, intolerance of egg in one—a familial manifestation which is at least interesting.

Dr. G. A. Bancroft, Natick: It seems to me asthmatic conditions may be of hay-fever origin, and of bacterial origin, and of dietetic origin. With the cases of hay-fever origin I have almost always found marked relief from the use of the pollen extracts as used by Dr. Goodale's instructions. He has detected the particular pollen extract, and in those cases of recent origin the asthma has subsided very satisfactorily, and as the patients have followed up the work, the relief seems to become permanent. I saw a man this morning, 50 years old, who has had hay-fever for years with marked asthma. He has had the pollen extract for years; and I asked him if he was going to begin it again, and he said he was so well he was not going to try it. "Last year I was better and this year I expect to be well," he said.

Then the bacterial cases: When seeking diligently for the toxin I have found that the autogenous vaccines have given some relief. In some cases they have seemed specific in their influence. One extremely interesting case: After a long hunt for the focus—the patient had an unusual amount of bridge work—we sought every source without avail, and finally removed part of the bridge work and found there the offending member apparently; and a vaccine made from that was followed by very marked relief.

As an example of the dietetic type of asthma—and I should like to have Dr. Walker's idea about it: A young schoolboy who was getting home from school Friday was followed Saturday by asthma, and a careful inquiry into his habits of eating showed that he was in the habit of eating apples very freely as soon as he reached home, and the only treatment I gave was to have him give up apples, which he adopted for six months, and he was free from asthma in any form whatever. At the end of that time he was suspicious that I was wrong in my opinion, for he was having a hard asthmatic attack. I asked him if he had any fruit that day, and sure enough, he had eaten fruit, which was followed by asthma. A few months later he ate some cooked apples, with the same type of asthma following. Now he is going without the fruit.

I have come to appreciate the work that the men are doing in this branch of research, for I think the people are benefiting by it more than by almost any other branch.

Dr. H. T. Baldwin, Chestnut Hill: All these cases that have been given are in the line of protein. How much work has there been done to determine if it is possible that there is any chemical cause similar to the absorption of proteins? Very recently I have had a case of very obstinate asthma which is very clearly susceptible to aspirin and which has been tested by Dr. Goodale and some others for protein anaphylactic reaction without any satisfactory results. This seems to me to be a chemical action. One five-grain tablet of aspirin I myself have seen produce asthma in this case. His feeling was that it would cause asthma, but I gave it to him one day, and within half an hour he vomited; he had not vomited before; had coryza and rhinitis and definite asthmatic symptoms with râles all over his lungs. By the end of the day the attack was subsiding, and the next day he was all right. I do not know whether any work has been done on that line or not.

Another thing which occurred to me was how to explain the action of adrenalin chloride, which works very well in these cases. Is it explained from the anaphylactic viewpoint? One patient I have seen recently who has proved very clearly since I gave her the adrenalin chloride that her asthma was caused by dogs. While I was persuading her to go through the skin tests—it took some time—I gave her several doses of adrenalin chloride, which gave her relief from her asthma in two minutes. Finally, she was persuaded to have skin tests from the two dogs which she owned, which proved clearly to be the cause, and we sent the dogs away, and ever since they have been gone she has had no attacks, whereas before she was having two or three attacks a week. By the way, when I gave that patient adrenalin chloride, I thought I would try her blood pressure; it was 168, and I gave her ten minims of a one to ten thousand solution of adrenalin chloride subcutaneously. Immediately after her symptoms subsided her blood pressure was 150, which was contrary to what I expected from the adrenalin chloride. I don't know how to explain that action of the adrenalin.

DR. F. R. STUBBS, Newton: I have very little to add. The modern treatment, so-called, is certanly a very expensive process for your patients. If we could only guarantee for them absolute cure, there would be no question about it, but several of the patients who have been through the hands of you gentlemen here have experienced very little relief and have spent money into the hundreds of dollars.

Now I think that these studies are extremely important, and they are certainly going to lead somewhere. By the studies that have been made we found out that removing our patients as we did in the old days, some two or three blocks, or up a hill, that that was really removing them from a stable or dogs or cats or oaks or some other of these offenders. I wish before the experiments are concluded that the men who are working will try to imitate what is actually taking place in nature and see what happens to ragweed pollen when a frost takes place. I myself am a victim of asthma due to ragweed. I get definite reactions from ragweed subcutaneous injections and absolutely no relief from injections of the extract taken from the first of May one year right through to the first of September. But last year on Cape Cod, we had a frost on the tenth day of September, which was unprofitable for the cranberry crop, but splendid for the hay-fever victims. The next day I had to see a patient in Pomfret, Conn., and rode from Cape Cod to Pomfret, Conn., with absolutely no symptoms, with perfect ease and no return of the hay-fever.

It seems to me if these remedies can be applied through inhalation, or if some process which, like the frost, destroys the action of the pollen, can be applied to the patient's sensitive mucous membranes in the nose, that then we are going to get somewhere. Until that time, I think that the remedies so far offered are by no means certain; and they are very expensive.

DR. F. H. ALLEN, Holyoke: I would like to ask Dr. Walker what fruits he found produced hay-fever and asthma.

DR. I. C. WALKER: We found that apples frequently caused asthma, and peaches occasionally. If the peach is peeled and the skin is thrown away, the patient can eat the pulp. Probably it is the fuzz on the peach skin. A case similar to that is willow. We have seen a case of the willow, which was not sensitized to the pollen of the willow, but was sensitized to the fuzz under the willow leaf; and treatment with that was followed by relief. The patient's house was surrounded by willow trees.

QUESTION: Can you eat them if they are cooked?

DR. I. C. WALKER: Yes, you can eat them if they are cooked.

A LADY: I am a hay-fever victim and can't eat melon or cantaloupe without getting very severe reactions of hay-fever, really more severe than from the ragweed, and I am very sensitive to the latter.

One of the Audience: I would like to ask Dr. Walker if he can give any information to the general practitioner if there is any relation between general tuberculosis and asthma, and whether there is some means whereby we can tell whether our patient is tuberculous or asthmatic when we first see him. It is almost impossible to tell whether the patient is tuberculous or asthmatic, and if the two come together it presents really a very pitiable subject.

Dr. I. C. Walker: True bronchial asthma does not run fever, and in over 400 cases we have seen, about 500 now, we have encountered only three cases of tuberculosis. I can't imagine a case of outspoken bronchial asthma simulating tuberculosis. The kind which we would like to call asthmatic bronchitis that has a cough all the time, that has bronchitis for two or three or four years, and finally develops asthmatic symptoms, wheezing and coughing in the night and shortness of breath and lots of expectoration *should not be* called true bronchial asthma. There isn't spasm of the bronchi. True bronchial asthma is a spasm of the smooth muscles of the bronchi; that is why adrenalin relieves—it paralyzes the nerve endings so that the smooth muscle distends and gets back to its normal caliber. The cases of asthmatic bronchitis are the ones that are relieved to a certain extent by expectorants and morphine. Morphine is a constrictor. The alkaloids of opium are divided into two groups—the papaverine group and the morphine group. The morphine group is a constrictor, while the papaverine group is a dilator; so that morphine should not act on the smooth muscles of the bronchi; whatever action it has is a quieting effect on the patient, but adrenalin and papaverine are dilators.

Book Reviews.

Oral Sepsis in Its Relationship to Systemic Disease. By Wliliam W. Duke, M.D., Ph.B. St. Louis: C. V. Mosby Company. 1918.

This volume explains in a brief and clear manner the relationship which frequently exists between systemic disorders and infections of the gum or alveolar process. Problems of bacteriology, immunology, and pathology, as well as dentistry, are discussed. The various ways in which oral sepsis may affect health—chronic inflammatory lesion, toxic effects, and local pain, referred pain, or headache—are considered. The facts set forth in this volume show that dental sepsis is an extremely common condition, and that it can cause serious disorder in many different ways One hundred and seventy roentgenograms illustrate various conditions, methods of treatment, and results.

The Destiny of the American Surgical Association. By J. Ewing Mears, M.D., LL.D.. Philadelphia: William J. Dorman. 1917.

"The Destiny of the American Surgical Association" is a small book recording briefly the history and purpose of the Association. Its founder, Professor Samuel D. Gross, was a distinguished member of the American Medical Association and had participated especially in the work of the Surgical Section. Believing that an independent body of surgeons would further develop and stimulate this work, he organized the American Surgical Association. The Association is national in character, thus bringing to its meetings and including in the pages of its volumes of "Transactions" the surgical work characteristic of the different portions of the country. During the thirty-seven years of its existence, the Association has effectively elucidated many of the great principles of surgical science, and has gathered into its circle of Fellowship the ablest members of the profession in Europe and America.

The Practical Medicine Series. Volume I: General Medicine. Edited by Frank Billings, M.S., M.D. Volume II: General Surgery. Edited by Albert J. Ochsner, M.D., F.R.M.S., LL.D., F.A.C.S. Chicago: The Year Book Publishers. 1918.

These volumes are the first two of a series of eight, covering the entire field of literature of medicine and surgery during the year 1917. This series is published primarily for the general practitioner, but the arrangement in several volumes enables those interested in special subjects to obtain easily information in the field in which they are particularly interested.

Volume I deals with the general aspects of medicine. Infectious diseases, diseases of the chest, bronchi, lungs and pleura, of the heart and blood vessels, of the blood and blood making organs, of the ductless glands, metabolism, the kidneys, stomach and intestines, liver and gall-bladder are considered.

Volume II contains a review of the literature for the past year on general surgery. It includes many articles on various aspects of military surgery. The large proportion of articles on abdominal surgery show that the position of this branch is a commanding one at the present time. Both volumes are illustrated and are of great practical value to the general practitioner.

Publications of the Red Cross Institute for Crippled and Disabled Men. Edited by DOUGLAS C. MCMURTRIE. No. 14, Series 1.

The Red Cross Institute for Crippled and Disabled Men has issued Numbers 12, 13, and 14, of Series 1, dealing with war cripples in Italy, Germany, and France.

"Provision for Vocational Reëducation of Disabled Soldiers in France." Number 14, Series 1, describes the steps taken by the French Government in creating national schools of reëducation. Existing trade schools were investigated and utilized as far as possible for reëducational purposes. At first, the majority of schools had no connection with military hospitals and received only discharged soldiers; but in 1916 the Government became convinced that vocational reëducation should be started before discharge. Schools were organized, therefore, in connection with the large physiotherapeutic hospitals and amputation depots throughout the country. In order to secure coördination, the Ministers of War, Labor, and the Interior created a National Office, to supervise the work of reëducation all over the country. All disabled men have been registered. Investigation has been carried out among employers and schools. Centers of readaptation have been formed which comprise hospitals of physiotherapy where the invalided soldier receives his functional reëducation and finishes his treatment, institutions of prosthetic equipment where artificial limbs are made and distributed, and schools of reëducation where there is provided agricultural, commercial, or trade training.

In France, almost all of the schools are boarding-schools, and comprise workshops, classrooms, dormitories, and dining-halls. The comparatively few day schools are chiefly guild schools. A further method of furnishing instruction consists in placing men as apprentices in private shops. Before men are recommended for discharge, they are supported by the Ministry of War. In many schools, wages are paid; in others, the products are sold and the proceeds are divided among the workmen. Among the trades taught are included shoemaking, printing, locksmithing, metal-turning, upholstery, wireless telegraphy, and the making of brushes, chairs, clocks, toys, and paper-boxes. Courses are also given in bookkeeping, stenography, typewriting, and industrial design. The importance of agricultural training is especially recognized. The length of the courses varies from about two to eight months. Prosthetic appliances are provided by the government, and placement is secured either through th National Office or public and private employment bureaus.

In the Appendix of this pamphlet are printed laws concerning the reëducation of disabled soldiers, and a list of reëducational schools.

Scopolamine-Morphine — Semi-Narcosis During Labor. By WM. OSBORNE GREENWOOD, M.D., B.S. London: Henry Frowde, Hodder and Stoughton. 1918.

The use of scopolamine-morphine has been both favorably criticized and condemned by various members of the profession. The author of "Scopolamine-Morphine—Semi-Narcosis During Labor," believing that no amount of criticism can negative the excellent results which have been obtained by this treatment, offers in this book a description of his technic and a record of the results of his experience. The chemistry and action of the drug are described, together with its effect upon mother and child. In regard to the mother, observation has led to the conclusion that voluntary contractions of abdominal muscles are not weakened and that post-partum hemorrhage is not increased by the use of scopolamine-morphine. On the other hand, the after-effects of its use show a remarkable absence of shock and exhaustion. In regard to the infant, the author believes that where reasonable care is exercised, the risks involved are no greater than in ordinary practice. He believes, also, that by reducing the fear of pain among women, the serious decline in birth-rate which the nation is facing might be remedied. Whatever opinion one may hold in regard to the use of scopolamine-morphine, this book offers a good exposition of its use.

Applied Bacteriology. Edited by C. H. BROWNING, M.D., D.P.H. London: Henry Frowde, Oxford University Press; Hodder and Stoughton, Warwick Square, E.C. 1918.

This volume is a collection of studies and reviews of practical value to those interested in the laboratory, the clinical, and the administrative aspects of medicine. The problem of diagnosis in intestinal infections, or "enterica," by bacteriological and serologic methods, is comprehensively discussed. The importance of differential diagnosis within the "enterica" group and of the Widal reaction is considered. A short but significant series of observations on immunity reactions in the typhoid-coli group is included, and in order to point out the dangers of indiscriminate generalizations in this field, a general review of the chemistry of antibody reactions has been added. A detailed account is given of the use of differential antiseptics for the isolation of small numbers of pathogenic organisms from mixtures of similar bacteria, especially the recovery of typhoid-paratyphoid bacilli from feces. Other observations deal with the use of calibrated pipettes in serological work, the diphtheria group, with special reference to the recognition of pathogenic members, antiseptics, the isolation of B.

diphtheriae by means of a simple medium containing telluric acid, the selective actions of thallium acetate and thorium nitrate, the use of ultra-violet radiation, and tetanus.

Interpretation of Dental and Maxillary Roentgenograms. By ROBERT H. IVY, M.D., D.D.S. St. Louis: C. V. Mosby Company. 1918.

This book offers to the medical and dental professions the data necessary for correctly diagnosing pathologic conditions about the teeth and jaw bones with the roentgen ray as an aid. The interpretation of roentgenograms, rather than the making of them, is considered, and references to technic are limited to special points involved in examination. The 259 roentgenograms included in this volume are negative reproductions, bone and hard tissues being light, and soft tissues and spaces dark, so that natural conditions may be studied more readily here than in the original negatives. In many of the odontograms showing periapical pathology, the author has been able to compare the pictures with the conditions found at operation. The normal anatomy and histology of the teeth and jaw bones, together with anatomic variations, the appearance that the roentgen ray should impart to plates and films after passage through such normal tissues and anatomic variations, dental pathology both from the clinical side and the histopathologic side, and the various abnormalities produced in the roentgenogram by disease are the most important points considered in the interpretation of odontograms.

Aids to Rational Therapeutics. By RALPH W. LEFTWICH, M.D., C.M., M.R.C.B. New York: William Wood and Company. 1918.

"Aids to Rational Therapeutics" is a complete study, uniquely arranged, dealing with therapeutic treatment of disease. This book is particularly valuable because of the systematic and rational method of grouping. Diseases which are of allied pathology and which require a common treatment are grouped together. The author has formulated forty groups and has added separately those which could not be classified in this manner. Treatment which may be applied to the whole group is supplemented by that which is special to each member. This method of teaching therapeutics enables the student to acquire a knowledge of the subject in a much shorter time than in the older method of learning each disease separately, and it gives a broader and new outlook to the practitioner. Symptoms, methods, and doses have been grouped. In regard to therapeutics in general, the sections dealing with Automatic Habit, the Hyperemic Group, and Insanity are of particular interest. The author emphasizes especially the benefit which may be derived from breaking habits. A section is devoted to doses and pharmacopoeial equivalents.

Waverley Researches in the Pathology of the Feeble-Minded. Vol. XIV, No. 11, May, 1918. Edited by WALTER FERNALD, M.D., A.M., and E. E. SOUTHARD, M.D., Sc.D.

This volume of the "Waverley Researches in the Pathology of the Feeble-Minded" presents a series of studies of brain anatomy. The first article deals with the general aspects of brain anatomy of feeble-mindedness. The second section gives a description of ten instances of feeble-mindedness of various grades, together with autopsy and microscopic findings. Article 3 attempts to correlate the brain anatomy and histology with clinical and especially with psychometric findings. These studies have not been made for the sake of eugenic, economic, or social interests. The following provisional conclusions have been made: (1) In the attempt to measure mental capacity by brain complexity, it has been found that brains of least complexity are correlated with minds of least range. (2) The number of cases of feeble-mindedness for which infection is responsible is much larger than has been supposed. (3) The question has been raised of the relation between occasional bursts of excitability and alterations of intracranial pressure with the production of hydrocephalus. There are included in this volume twenty full-page plates, illustrating the cases of feeble-mindedness considered.

Diseases of the Throat, Nose, and Ear. By WILLIAM LAMB, M.D., C.M., M.R.C.P. Fourth Edition. New York: William Wood and Company. 1918.

This volume, "Diseases of the Throat, Nose, and Ear," has been written as a practical guide for senior students and junior practitioners. The appearance of the fourth edition gives evidence of its usefulness. Few additions have been made to the text, but eighteen pages of new material have been added, dealing chiefly with certain risks attending the tonsil and adenoid operation, an amplified description of the submucous resection of the septum, and an illustrated description of the intranasal treatment of fronto-ethmoidal suppuration. In the aural section, vestibular symptoms, the treatment of epidermal and mixed accumulations in the meatus, and the genesis and means of prevention of otorrhea are discussed. The author emphasizes the importance of mastering the methods of examination and of acquiring facility in the use of reflected light. This book furnishes a practical survey of diseases of the ear, nose, and throat and methods of treatment. One section is devoted to selected formulae.

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INDUSTRIAL AND OBSCURE LEAD POISONING.

LEAD poisoning, with its diverse symptoms and causes, is always a complex study. The whole subject presents a series of phenomena which it is sometimes peculiarly difficult to coordinate. This difficulty, which exists at all times, has been increased of late by conditions that have grown directly out of the war. An enormous use of lead salts and drying materials has been made in connection with industries which are essential in preparing nations and armies for war—in the manufacture of airplanes, motor cars, ships, and shells. From such a diversity of industries and workers it is difficult to present a clear and distinct picture of a complex effect such as lead poisoning. This fact may explain the unwelcome truth that many cases go unrecognized. Among instances of this kind we may regard some of the cases which are often, and wrongly, called "ptomaine poisoning." Not a few of these, if studied more attentively, exhibit a startling resemblance to plumbism, especially in its nervous and ocular forms. When a case of poisoning begins to show these characteristics, the cause must be sought more deeply. It is our opinion, based upon inquiries and personal experience, that today many cases classified as food or milk poisoning admit of a more precise definition as lead poisoning, while they also show the need for some exhaustive testing by the expert who would scientifically differentiate them. The records of medical jurisprudence and of clinical experience contain striking examples of poisoning after the eating of canned meats, vegetables, fruits, and milk, which might have been found by exact tests and analysis to be the accumulated effects of small doses of lead continually absorbed.

Lead poisoning must be considered in its relations to work and habits of eating and drinking, upon which depend so essentially the health, well-being, and efficiency of the employed. The conception of lead poisoning presupposes a defective system of hygiene and factory inspection, both private and official. Notwithstanding all that has been written on the subject, it is necessary to repeat that employers and workmen must be taught that bad habits of eating and drinking, bad customs of rest as well as of work, lower the product of industry because they lower the standard of the man as a healthy being. This truth is particularly well illustrated in the ways by which lead poisoning arises. According to Sir Thomas Oliver, the symptoms of lead poisoning, whether caused by working in lead, inhaling dust, or drinking water contaminated with lead, are due: (1) to lead compounds circulating in the blood; (2) the formation and retention of toxic products within the system, causing deranged function of the excretory organs; and (3) to structural changes of internal organs which are a consequence of the action of lead.

It is interesting to note at this point the conflicting views of pharmacologists and experts on clinical medicine. While Cushny says, "The effects of the sudden absorption of lead in man are unknown," Sir Thomas Oliver observes that, beyond question, "lead salts are all more or less poisonous. Even so insoluble a salt as the sulphate is acted upon by the intestinal juices, and is more or less soluble." Following this line of reasoning, many authors have classified lead salts according to their solubility in gastric juice, or in dilute hydrochloric acid. This is a step in advance, for up to recent years it has been held that there is an essential difference between soluble and insoluble lead salts as regards their toxicity; but owing to later researches the distinction has broken down. The distinction was never of much value. In practice, a salt which becomes soluble in the body juices is assimilated like a soluble salt, and in the last resort the alleged difference between lead salts fades away.

It is now realized that large doses of lead, for example, of lead acetate, may sometimes be poisonous, that is to say, a considerable portion may be absorbed. Such cases may not be common, but they do occur, and instances are alleged by Weyl, Rambousek, and E. Leymann. These writers insist that the mode of administration is a secondary matter, and that lead salts, whether inhaled, absorbed through the skin, or swallowed, are always taken into the body via the alimentary tract. Sir Thomas Oliver takes this view: "Admitting that the lungs and the respiratory passages are frequent channels of entrance of lead into the system, I am of the opinion that it is by the alimentary canal, even when lead has primarily reached the upper part of the respiratory passages, that most of the poison enters the body." What actually happens to workmen employed in lead factories is that most of the lead dust is caught on the teeth and in the mouth and only a small part reaches the lungs.

Such a conclusion as this obviously affords a means of disentangling some of the confusing factors in lead poisoning. It leads to a very simple explanation of the poisonous action of such compounds as lead oxide, and to a very simple interpretation of the complicated puzzle of poisoning after insoluble salts. Lead oxide, as Alice Hamilton points out, forms a fine, dry, penetrating dust. Such a dust, write Legge and Goadby (Lead Poisoning and Lead Absorption, p. 98) "circulating in the air is many times more dangerous than lead actually swallowed." The reason seems to be that the frequently repeated entrance of small quantities of lead into the system is more likely to produce poisoning than one or two large doses when swallowed. Legge and Goadby based their conclusion upon animal experiments, but these results are not recent enough to explain very fully or clearly the present position of the problem.

This problem is that lead poisoning is a subtle and prevalent form of poisoning, and that its precise origin is often obscure, although it is now clear that any salt of lead may in favorable circumstances produce acute and chronic symptoms. Animals have been poisoned by licking pails which contained white lead paint. An instance is given in the *Journal of the American Veterinary Association*, 1918, p. 706. Professor Lereboullet in a recent article on "les deux saturnins" (*Revue gen. de clinique et de ther.*, 1917, p. 611) shows that the barriers between the soluble and insoluble salts, between acute and chronic poisoning, have broken down, though the antinomy between experiment and practice still remains. Craik (*British Medical Journal*, 1917, ii, p. 650) found punctate basophilia after the exhibition of lead acetate for diarrhea "after the manner of an older generation." In one of Professor Lereboullet's cases, the patient, a worker in a factory of electric accumulators, presented a polyneuritis, abolition of reflexes, lymphocytosis, albumosis, with a certain degree of hypertension, or a saturnine meningitis. It is also reported from German sources that lead poisoning has suddenly developed after a bullet wound. In such cases, it is believed, insoluble salts of lead have been dissolved by some unknown agency and rendered poisonous. In one case the lead was dissolved by a dose of potassium iodide, and the amount thus set free was sufficient to cause death.

From recent reports it may be assumed that the effects of the sudden absorption of lead are more common than has hitherto been believed. Owing to the increased consumption of tinned meats, fruits and vegetables during the war, cases of acute and chronic poisoning have been accumulating, and these supply definite corroboration of the impression that lead salts are responsible for many obscure cases, which have escaped notice largely because there has been a prepossession that insoluble lead salts are not in themselves in any causal nexus. It seems necessary to revise what has hitherto been accepted and believed about lead.

VOLUNTEER MEDICAL SERVICE CORPS.

In last week's issue of the Journal, too late for editorial comment, we published an important communication from Dr. Franklin Martin, relative to the contemplated extension of the Volunteer Medical Service Corps to include all qualified physicians not already commissioned in the Medical Reserve Corps of the United States Army, Navy, or Public Health Service. This plan is apparently intended, by what amounts to a universal voluntary enrollment, to segregate the medical profession from the operation of the contemplated extended draft of men between eighteen and forty-five. Though the principle of selective service, as it has been applied by the draft during the present war, is entirely free from the stigma of distinction between volunteers and conscripts, it is, nevertheless, highly desirable that medicine, as one of the most liberal professions, should make its entire service in this national emergency without any suggestion of compulsion. Physicians who have not already entered the Medical Reserve Corps have refrained from worthy motives, but there is none who is not ready to pledge his all and utmost wherever necessity of service to his country may exist. The Volunteer Medical Service Corps is to be an expression and record of this pledge on the part of every qualified physician in the United States. It is to be hoped and expected that every physician, by joining this corps promptly, not only will give evidence of his own patriotism, but will thereby uphold and maintain the free dignity of the profession which he has the honor to serve.

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ENROLLMENT OF PHYSICIANS.

On August 8 the following statement was authorized by the War Department, signed by Newton D. Baker, Secretary of War:

"The War Department today has suspended further volunteering and the receipt of candidates for officers' training camps from civil life. This suspension will remain in force until the legislation now pending before the Congress with regard to draft ages is disposed of and suitable regulations drawn up to cover the operation of the slective system under the new law. . . "

Fearing that this order might be misinterpreted by doctors who would not distinguish between enlistment as a private soldier and enrollment as an officer in the Medical Reserve Corps, on August 9 the Secretary of War was asked to issue a statement making clear this point.

In response to this request on August 10, the following statement was authorized by the War and Navy Departments:

"Orders issued by the War and Navy Departments on August 8 suspending further volunteering and the receipt of candidates for officers' training camps from civil life do not apply to the enrollment of physicians in the Medical Reserve Corps of the Army and the Reserve Force of the Navy. It is the desire of both departments that the enrollment of physicians should continue as actively as before so that the needs of both services may be effectively met.

(Signed) Josephus Daniels,
Secretary of the Navy.
(Signed) Newton D. Baker,
Secretary of War."

It is desirable that the definite attention of the medical profession be called to this interpretation in order that enrollment for the Medical Reserve Corps of the Army and the Reserve Force of the Navy, which is going on so rapidly at the present time, shall not be interrupted.

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MEDICAL NOTES.

The Health Officer and the Big Fight.—It is said to take nine men working "over here" to keep one soldier fighting "over there." Clearly, therefore, it is wise to keep the nine workers healthy and working as well as the one soldier.

Which health officer should stay at home and who should go to war? How is the nation bearing up under the war-strain? What are the special war-time health menaces of the civil population, and what are we going to do about them? What headway are we making against the venereal diseases? These are the questions to be considered at the convention of United States and Canadian sanitarians at Chicago, October 14-17, to be held under the auspices of the American Public Health Association. Some of the military sanitarians who will address the meetings are Surgeon-General Gorgas, Colonel Victor C. Vaughan, and Major William H. Welch of the Army Medical Corps. Other speakers at the general sessions will be George H. Vincent, president of the Rockefeller Foundation; Dr. Charles J. Hastings, president of the American Public Health Association; Dr. W. A. Evans, Assistant Surgeon-General Allan J. McLaughlin, U.S.P.H.S., Dr. Ernest S. Bishop, Dr. Lee K. Frankel, Dr. Frederick L. Hoffman and others.

There will also be papers upon laboratory, industrial hygiene, vital statistics, food and drugs, sanitary engineering, sociological, and general health administration subjects.

As the health of the civil population has a direct bearing upon the winning of the war, mayors and governors are being requested to send their health officers to the conference in spite of the present high cost of government.

The final program will appear in the *American Journal of Public Health* appearing September 25. For further information write to A. W. Hedrich, Secretary, American Public Health Association, 1041 Boylston Street, Boston.

Venereal Diseases and Industry.—The July number of "The Common Health," issued by the Massachusetts State Department of Health, contains an important article dealing with venereal disease and industry. In European armies, this plague has often been responsible for more inefficiency than engines of war. Confronted with the problem, the United States has developed a remedy which has resulted in the lowest venereal disease rate in the Army in history.

It must be thoroughly recognized, however, that civilian disability is as serious a menace as military. An industrial program has been drawn up, and employers have been urged to coöperate in making it a success. The plan advocates distribution of literature, confidential interviews between employees and superintendent, examination by competent physicians, investigation of cases for treatment, provision for leave of absence, with pay for employees in the infectious stage, and regular examinations even after the patient has been pronounced cured. Placards are to be posted and booklets containing reliable information distributed. Moving-picture films, lectures, and follow-up methods will also be used. The program meets two fundamental reasons for the prevalence of syphilis and gonorrhea--ignorance and lack of proper treatment.

This bulletin contains, also, an interesting discussion of industrial nursing in Massachusetts. Approximately 125 factories and stores in Massachusetts have established some form of nursing service. This means economy for the employer, because it reduces absences due to illness, decreases accidents, and results in a larger output of goods. For the community, this service means prevention of illness in the home, for patients receive treatment before they become seriously ill. Large manufacturing plants usually require a full-time nurse. For the small firm, there are available the two following forms of service, supervised by the local Visiting Nurse Association: (1) the group service, whereby adjacent plants share the time and expense of one nurse, and (2) hourly service, in which one nurse spends one hour or more daily in one or more plants. The success of industrial nursing depends chiefly upon the personality of the nurse and her ability to do preventive work.

London Mortality Statistics for May, 1918.—Statistics recently published show that the total death rate of London for May, 1918, reached a total of 13.7 per thousand inhabitants living. In the various districts and boroughs, the highest rate was 19.8, in Southwark; the lowest rate was 9.5, in Hampstead.

WAR NOTES.

Massachusetts Physician Wins War Cross.—Probably the first Massachusetts physician to receive the *croix de guerre* is Lieutenant Max P. Cowett, of Chicopee Falls, formerly an interne and house physician at Bellevue Hospital, New York. He was honored by the French Government in recognition of heroic work in the trenches. Lieutenant Cowett was graduated from Bellevue Medical College in 1915 and entered the national service in May, 1917.

Dr. Falvey Joins Medical Reserve Corps.—Dr. Humphrey J. Falvey, of Worcester, Mass., has been commissioned a first lieutenant in the Medical Reserve Corps and has been ordered to report to Fort Oglethorpe, Ga. He is a graduate of the Baltimore Medical School. It was chiefly through the efforts of Dr. Falvey that the city of Worcester secured night ambulance service.

War Relief Funds.—On August 20, the totals of the principal New England War Relief funds reached the following amounts:

Belgian fund	$655,582.73
French Wounded fund	389,518.33
British Imperial fund	118,590.87

HAVERHILL PHYSICIAN GRANTED COMMISSION.—Dr. Frank H. Coffin, the ninth Haverhill physician to enlist for military service, has been commissioned first lieutenant in the Medical Reserve Corps. He will report at a base hospital at Hoboken, N. J. Lieutenant Coffin graduated from Boston University Medical School in 1900, and has since served as interne for a year at the Lowell General Hospital, as a member of the Hale Hospital staff, and as school physician.

SLIGHT PNEUMONIA INCREASE IN THE ARMY.—There was a slight increase in the number of pneumonia cases among the troops in the United States during the seven-day period ending Aug. 9.

Admission and noneffective rates generally in all camps increased slightly, but deaths from disease still were at the annual rate of 3.18 per thousand.

DEATH OF MAJOR BEAL.—Major Howard W. Beal, whose death in France is reported from Washington, was personally thanked by Queen Mary of England for the excellent war work he did at the American Women's Hospital in Paignton, England. The British Government highly regarded his services as a surgeon.

Dr. Beal gave up his practice in Worcester early in the war and sailed on the first Red Cross ship from this country. He returned here early in 1915 broken in health because of his war work abroad, but crossed to Europe again when the United States entered the war.

He was consulting surgeon at the base hospital of the first division before being transferred to a place near Montdidier, France, where he received wounds that resulted in his death. He graduated from Andover and Harvard Medical School.

BOSTON CITY HOSPITAL UNIT.—The Boston City Hospital medical unit is now in the war zone. The unit has established its battle relief station and is ministering to wounded and sick soldiers.

Boston's latest contribution to the organized relief work with the overseas armies is made up mainly of doctors and nurses from the staff of Boston City Hospital. It went across as a much more elaborate organization than the original plans contemplated, and it was recruited to the augmented strength from other Greater Boston hospitals.

Officially it is Red Cross Base Hospital Unit No. 7. It will carry through all its work, however, the popular designation "Boston City Hospital Unit." It is commanded by Maj John J. Dowling, superintendent of the City Hospital. Maj. Edward H. Nichols is chief of surgical service and Maj. John Jenks Thomas chief of medical service. The nurses are headed by Miss Emma M. Nichols, superintendent of nurses at the City Hospital.

The unit takes up its tasks as a compact organization, drilled to the utmost military efficiency by weeks of training at Camp Devens and later at New York. It was organized early in the year and entered upon its training at Camp Devens early in April. The original personnel had 55 nurses from the City Hospital. This was augmented to 100 nurses, those from other hospitals being admitted to fill the ranks. The surgical and medical staffs, numbering many of Boston's leading doctors, were increased in numbers proportionately, as was also the enlisted force of orderlies, cooks, and clerks.

ONLY ABOUT ONE IN TWENTY OF WOUNDED SUCCUMB.—Of the American soldiers wounded in the Marne-Aisne offensive, probably less than one in twenty will die from their wounds, more than four-fifths will be returned to service, and only 14% will be discharged for disability, according to a statement of the chief of staff, based upon the officially attested experience of the Allies during the four years of war. The statement follows:

"In connection with the casualties among the American expeditionary forces in the Marne-Aisne offensive, it should be stated upon the basis of the officially attested experience of our associates during four years of this war that of wounded soldiers sent to hospitals for treatment, fewer than one in 20 die. Of all the soldiers sent to the hospital only 45 in every 1000 died. These include those who die of disease as well as those who die of wounds. Of all soldiers wounded in action more than four-fifths return to service, many of them in less than two months. It is necessary to discharge for physical disability only 14.5%.

These figures are based on an average of both British and French official figures, including both officers and men."

Hospital Ship Torpedoed.—The torpedoing of the British hospital ship *Warilda* was one of the most harrowing disasters in the history of submarine warfare. The number of dead is variously estimated from 105 to 130 and upward, and includes several women nurses.

The ship carried 600 sick and wounded. Among them were seven Americans, two officers and five enlisted men, all of whom have been accounted for except one corporal. There were aboard 89 nurses and members of the voluntary aid department, and the crew comprised about 200 men.

More than 650 survivors were given first aid treatment, food and clothing. The patients were placed aboard special trains, which had been waiting to receive them, and sent to hospitals in various parts of the country.

Just over the dynamo was the wardroom, which contained more than 100 patients. Most of these were killed outright by the explosion and the others, many of whom had been freshly injured by the torpedo, found themselves trapped. It was impossible for outside aid to reach them, and all except a few who jumped overboard and were picked up, perished. This part of the ship quickly settled and water flooded the wardroom, drowning the men caged there.

All the soldiers and the nurses testify to the heroic efforts of the crew. Under the direction of the officers they went coolly and methodically about the difficult task of bringing the sick and wounded up on deck. As many as could be handled in this manner were placed in slings and lowered to the escorting destroyers. The morale of the wounded lying on deck waiting to be taken off was of the finest character. They neither complained nor urged the rescuers to hurry. The less seriously disabled assisted their more unfortunate mates to go first. The American Red Cross is making the survivors comfortable.

Japanese Doctors to Aid Americans.—From the town of Tsuruga, Tokio, 40 trained medical workers, mostly Japanese, and including six physicians and 18 nurses, have been sent by Japan as a chapter of the American Red Cross at Vladivostok. There were no sailing accommodations on the steamer that carried them, and they slept on deck so as to avoid delay in their mission.

All Doctors in Class 1 Ordered in Service.—Massachusetts physicians and surgeons who are in the draft age and in Class 1 and have not already volunteered into the Army or Naval Reserve have been ordered into military service.

The registrants were inducted August 11, and are to report at Fort Slocum, N. Y., where they will be given special training. The men are to be taken regardless of whether they are physically fit for general or special service.

Massachusetts Needs 500 More Nurses to Fill Quota.—Massachusetts still needs 500 young women to register for service in order to fill her quota for the United States Student Nurse Reserve.

It is hoped that this number may not only be reached, but exceeded, before the close of the drive, which officially ends on August 31, although the time for registration has been extended. The government agencies in Washington coöperating in the drive will await with eagerness the reports from the States, to learn if the full number required, 25,000, has been reached.

Miss Helen Wood, who is representing the Council of Defense at the Central Recruiting Station, at the Massachusetts General Hospital, states that over 1000 young women have applied to her personally for registration blanks, and the greater number of these have proven eligible, having had the necessary education and being of good health, the two main requirements. Application blanks are being issued from many other hospitals in the State, where full information may be obtained.

War Hospital Wanted for Boston.—Use of the West Department of the Boston City Hospital, located in West Roxbury, has been offered to the War Department by Mayor Peters for New England wounded soldiers returning from France. This group of buildings, originally intended for children, can accommodate at present about 165 patients, but changes can be made so that there will be room for between 300 and 400 patients. The Mayor also urged that the Government accept the land adjacent to the hospital for the building of its New England hospital for sick, wounded, and convalescent men.

BOSTON AND MASSACHUSETTS.

Week's Death Rate in Boston.—During the week ending August 17, the number of deaths reported was 193, against 173 last year, with a rate of 12.83, against 11.68 last year. There were 37 deaths under one year of age, against 47 last year.

The number of cases of principal reportable diseases were: diphtheria, 39; scarlet fever, 5; measles, 22; whooping cough, 38; typhoid fever, 4; tuberculosis, 56.

Included in the above were the following cases of non-residents: diphtheria, 9; scarlet fever, 1; typhoid fever, 1; tuberculosis, 4.

Total deaths from these diseases were: diphtheria, 1; whooping cough, 3; tuberculosis, 17.

Included in the above were the following non-residents: tuberculosis, 1.

Adams Nervine Asylum.—The forty-first annual report of Adams Nervine Asylum records 216 patients under treatment during the year 1917. Of these, 9 were discharged as recovered, 101 relieved, 66 not relieved, 3 declining treatment, and there was 1 death. For financial reasons, the Men's House was closed in November. Work in the occupation room has been undertaken by 98 patients. There are now 16 pupils in the training school.

NEW ENGLAND NOTE.

$2427 Raised for Portsmouth Hospital.—Tag day of the Portsmouth (N. H.) Hospital on August 10, was the most successful of any held for years; $2427 were collected.

Miscellany.

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In response to the postal card request for funds from physicians in Massachusetts who are not in Government Service, the Massachusetts State Committee, Council of National Defense, Medical Section, hereby acknowledges subscriptions from the following physicians, through August 21. The funds are for printing, postage, rent of typewriter and extra clerical assistance.

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Earle E. Tilton, Boston.
Edward A. Tracy, Dorchester.
Fred E. Varney, North Chelmsford.
Samuel H. Calderwood, Roxbury.
Frederick Dugdale, Boston.
Paul A. Hudnut, Northampton.
Ernest Tellier, North Attleborough.
Richard Dutton, Wakefield.
Franklin R. Ireson, Marblehead.
A. S. Garland, Gloucester.
J. G. Hayes, Williamsburg.
George W. Haywood, Lynn.
George H. Scott, Roxbury.
Frederick J. Goodridge, Cambridge.
Arthur F. Warren, Chicopee Falls.
George M. Sheahan, Quincy.
A. C. Hands, Cambridge.
H. A. Hands, Cambridge.
Horace Packard, Boston.
C. E. Durant, Haverhill.
George T. Tuttle, Waverley.
J. V. Thuot, New Bedford.
Edward J. Dailey, Somerville.
George A. Boucher, Brockton.
Herbert J. Hall, Marblehead.
D. A. Sargent, Cambridge.
T. P. Hennelly, Pittsfield.
C. H. Liverpool, West Somerville.
William S. Bigelow, Boston.
Oliver H. Everett, Worcester.
William T. Haly, Salem.
R. T. Glendenning, Manchester.
G. W. Nickerson, Stoneham.
J. J. Fitzgerald, Haverhill.
Robert C. Gwin, Allston.
Daniel E. Brown, Brockton.

DIETARY VALUE OF CORN AND WHEAT PRODUCTS.

The Public Health Report issued for May 31, 1918, describes the growth-promoting properties of foods derived from corn and wheat. An investigation has been carried out to determine whether corn and wheat products used in human nutrition exhibit similar dietary deficiencies as those of the whole grains. It has been found that the "highly milled" products are inferior in dietary value to foods prepared from the whole grain. Experiments with "war bread" indicate that persons with delicate digestion are subject to temporary digestive disturbances as a result of a change from "white" bread to bread containing a considerable percentage of bran. "White" bread is not adequate for maintaining normal growth, for it is deficient in antineuritic fat-soluble vitamine, and in protein and inorganic salts. A wheat flour, containing considerable part of the germ and superficial layers of the grain, supports the growth of mice and pigeons especially well when supplemented with inorganic salts. "Highly milled" corn grits is a failure as the exclusive food of young hogs; the whole corn kernel, however, supplemented by inorganic salts, promotes growth. No evidence of a toxic action of a whole wheat diet was obtained in the experiments on squabs which were fed on whole wheat meal, supplemented by a suitable salt mixture. The investigation shows that "whole wheat" flour, or old-fashioned corn meal, contains more dietary value than "white" and "highly milled" corn foods.

The United States Public Health Report issued for June 7, 1918, contains an article showing the results of an investigation of the vitamine content of corn and wheat products.

It has been demonstrated that the vitamines are not distributed evenly throughout the corn and wheat kernels, and there is very little vitamine in the starchy part of these cereals, although the bran germ portions of the grain contain a considerable amount of these substances. These results were obtained by experimenting on fowls and noting the time necessary for the appearance of polynueritic symptoms. By experimenting on mice and squabs, information was obtained concerning the fat-soluble vitamine; the germ contains most of the fat, as well as the fat-soluble vitamine in the grain.

The object of the investigation described in this report was to correlate the phosphorus content of corn and wheat foods with their content in anti-neuritic and fat-soluble vitamine. Special emphasis was placed on the distribution of phosphorus in the various products obtained from modern corn and flour mills. The phosphoric anhydride content indicates that the product is poor in vitamines.

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DUTY OF PHYSICIANS WITH RESPECT TO ABORTIONS AND HOMICIDES.*

The Chief Medical Examiner calls attention to a matter of grave importance in the medicolegal and criminal investigation of cases of abortion and suspected abortion dying in city and private hospitals, and more especially in the various private sanitaria in the City of New York. The attending gynecologists and surgeons and their respective staffs of internes appear to be singularly unaware of their responsibility to the prosecuting authorities (the district attorneys of the counties and the medical examiner's office, in regard to the preservation of the pathological material of such abortions, namely, the curettings and, in some cases, the uterus removed by hysterectomy. The Chief Medical Examiner is certain that if the attention of the medical profession is called to this subject that there will be a prompt amelioration of the deplorable situation.

This neglect on the part of the medical profession appears to be due to the fact that in none of the medical schools of the country are the students adequately instructed as to the responsibilities of the medical profession to the prosecuting attorneys in regard to homicides and cases of manslaughter. Since many of the large city and private hospitals have at the present time a more or less well-organized pathological department, a demand upon these laboratories for the proper preservation and recording of such pathological material which passes through their hands would seem reasonable. In the case of hospitals which are not sufficiently endowed to have laboratories, a request for the proper preservation (in 10% formalin) of such material, in containers of sufficient capacity, would seem not unreasonable. Attention is called to the fact that neglect to preserve such material renders physicians *participes criminis* in any action which the district attorney of the county may deem necessary. In view of the importance of the matter, there is no good reason why remissness should not be punished.

The Chief Medical Examiner also points out the frequent failure on the part of surgeons, to preserve and identify properly bullets or pieces of bullets removed by them at operation from the subjects of homicidal attacks.

In passing, we call our readers' attention to the provisions of Section 31 of the Sanitary Code, which requires physicians to file with the Department of Health, a certificate of death in all cases of stillbirths.

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RECENT DEATHS.

Frederick Henry Cleaves, M.D., died at his home in Brookline, August 19, 1918, aged 54 years. He was a graduate of George Washington University Medical School in 1887, and was a Fellow of the Massachusetts Medical Society and of the American Medical Association.

Edward Tufts Williams, M.D., died at the Boston City Hospital, Aug. 5, 1918, aged 73 years. He was born at Charlestown, Nov. 13, 1844, graduated from Harvard College in the Class of 1865, and from Harvard Medical School three years later, and settled in practice in Roxbury, where he passed his life. He had been a councilor of the Massachusetts Medical Society, physician to the Roxbury Dispensary and Roxbury Charitable Society, and to the Overseers of the Poor for Roxbury. He contributed many articles to the Boston Medical and Surgical Journal, among them "Moses as a Sanitarian," and descriptions of a uterine dilator and of a tracheotomy tube.

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* From the weekly bulletin of the New York City Health Department, April 7, 1918.